

REMARKS

The above amendment with the following remarks is submitted to be fully responsive to the Official Action of October 29, 2003. Reconsideration and allowance of this application are respectfully requested.

Claims 1-24 were pending in the present application prior to the present amendment. In response to the Office Action, claims 1-17 and 19-24 are amended. No new matter is introduced by the present amendments. Therefore, claims 1-24 are pending in the present application and are believed to be in proper condition for allowance, as further argued below.

On page 2 of the Office Action, the Office Action indicates that Applicants' claim for priority is acknowledged but also indicates that no certified copy of the Australian application has been filed in the instant application. However, Applicants, respectfully submit that, as stated in MPEP 1893.03(c), the requirement for a certified copy of the foreign priority application has been fulfilled by Applicants' providing a certified copy to the receiving office or International Bureau (the International Bureau forwards a copy when the international application is forwarded to each designated office). Accordingly, Applicants respectfully submit that the stamped copy of the priority document should be acceptable to establish Applicants' priority claim. Thus, Applicants respectfully request acknowledgment of the claim for priority, along with an indication that the certified copy of the priority application has been received in the next communication.

Also on page 2 of the Office Action, claims 1-24 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,412,676 to Schnier et al. (hereinafter Schnier). In view of the claim amendments provided above and the comments below, Applicants respectfully traverse this rejection.

The Schnier patent is directed to a method and apparatus for stabilizing the relative frequency offset between a laser and a resonant optical cavity (Abstract).

In contrast, the present invention as recited in independent claim 1, recites a method for sensing and controlling the frequency of a laser beam directed to an optical cavity including the steps of: introducing a misalignment in incident laser radiation associated with the laser beam to produce substantially only a resonant TEM00 mode and a non-resonant TEM01 mode, producing a single control beam resulting from modal

interference generated by the TEM00 and TEM01 modes and detecting at least two spatially distinct portions of the control beam to produce at least two signals, each of the at least two signals indicative of the respective interference of the two correspondingly spatially distinct portions of the TEM00 mode with two correspondingly spatially distinct portions of the TEM01 mode, and producing an error signal indicative of the difference between the TEM00 mode frequency and the cavity resonance frequency from the two signals. Applicants respectfully submit that Schnier does not disclose or suggest this combination of features.

For example, the Schnier patent does not disclose detecting at least two spatially distinct portions of the control beam to produce at least two signals, each of the at least two signals indicative of the respective interference of the two correspondingly spatially distinct portions of the TEM00 mode with two correspondingly spatially distinct portions of the TEM01 mode, as recited in independent claim 1. Instead, as illustrated in FIG. 3 of Schnier, there are two separate beams detected. Applicants submit that there is no detection of spatially distinct portions of the beam resulting from the modal interference. Rather, Schnier spatially filters part of the beam and uses a power comparison of these relative parts to create a correction signal.

Further, Applicants respectfully submit that Schnier does not disclose producing an error signal indicative of the difference between the TEM00 mode frequency and the cavity resonance frequency from the two signals, as recited in independent claim 1 of the present invention. Instead, as illustrated in FIG. 3, Schnier spatially filters one beam to produce a first power measurement and spatially filters a second beam at a different location to produce a second beam. These two measurements are used to create the correction signal (see column 5, lines 42-53 of Schnier). Thus, contrary to the claimed invention, Schnier is not measuring power at spatially distinct portions of the same beam.

Applicants respectfully submit that independent claim 13, directed to a similar optical system, is allowable for at least the same reasons as described above. Additionally, dependent claims 2-6 and 14-18 are allowable for at least the same reasons described above with respect to independent claim 1, as well as for reasons of their own.

For example, dependent claims 4, 5, 16 and 17 are variously directed to describing that the misalignment is achieved by either tilting or offsetting. The Office Action

indicates that Schnier does not teach specifically how to misalign the input beam but that it would have been obvious to one of ordinary skill in the art to achieve this misalignment by tilting or offsetting since they are well known. Applicants submit that this appears to be the use of Official Notice, and submit that Schnier does not provide one of ordinary skill any guidance or motivation as to the specific manner of misaligning the beam. Accordingly, Applicants, respectfully request that in the next Office Action, the Examiner provide a supporting reference (and associated combination motivation/reasoning) that shows a teaching of the claimed misalignment techniques. Otherwise, Applicants respectfully request reconsideration and withdrawal of the rejection.

Additionally, dependent claims 6 and 18 are directed a feature of the invention in which the control beam reflected from the cavity is focused onto a detector. Applicants submit that Schnier does not disclose such a feature. Instead, Schnier merely detects two separate beams in transmission via a bend linear cavity. Thus, Applicants respectfully request reconsideration and withdrawal of the rejection.

In accordance with another exemplary aspect of the present invention, independent claim 7 describes a method for sensing and controlling a two beam interferometer such that the relative path length of the two beams is fixed, including the steps of: introducing a misalignment between the two beams to produce substantially only a TEM00 mode and a TEM01 mode, producing a single control beam resulting from the modal interference of the TEM00 and TEM01 modes, detecting at least two spatially distinct portions of said control beam directed from the interferometer to produce at least two signals each indicative of the interference of the correspondingly spatially distinct portions of the TEM00 mode with the correspondingly spatially distinct portions of the TEM01 mode, and producing an error signal indicative of the path length difference for the TEM00 modes from the signals. Applicants respectfully submit that Schnier does not disclose or suggest this combination of features for at least the same reasons argued above with respect to independent claim 1 of the present invention.


Applicants respectfully submit that independent claim 19, directed to a two beam interferometer is allowable for at least the same reasons as described above. Additionally, dependent claims 7-12 and 20-24 are allowable for at least the same reasons described above with respect to independent claim 7, as well as for reasons of their own.

For example, dependent claims 10, 11, 22 and 23 are variously directed to describing that the misalignment is achieved by either tilting or offsetting of the control beam. Again, the Office Action indicates that Schnier does not teach specifically how to misalign the control beam but that it would have been obvious to one of ordinary skill in the art to achieve this misalignment by tilting or offsetting since they are well known. Applicants submit that this appears to be the use of Official Notice, and submit that Schnier does not provide one of ordinary skill any guidance or motivation as to the specific manner of misaligning the beam. Accordingly, Applicants, respectfully request that in the next Office Action, the Examiner provide a supporting reference (and associated combination motivation/reasoning) that shows a teaching of the claimed misalignment techniques. Otherwise, Applicants respectfully request reconsideration and withdrawal of the rejection.

Additionally, dependent claims 12 and 24 are directed to a feature of the present invention in which the control beam reflected from the cavity is focused onto a detector. Applicants submit that Schnier does not disclose such a feature. Instead, Schnier merely detects two separate beams in transmission via a bend linear cavity. Thus, Applicants respectfully request reconsideration and withdrawal of the rejection.

In view of the foregoing, it is submitted that the present application is in condition for allowance and a notice to that effect is respectfully requested. However, if the Examiner deems that any issue remains after considering this response, the Examiner is invited to contact the undersigned attorney to expedite the prosecution and engage in a joint effort to work out a mutually satisfactory solution.

Respectfully submitted,


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